CLAIMS

1. A correction-factor determination apparatus comprising:

an image-data generation section for performing simulation of how an eyesight-test-chart target is seen, according to measurement data which indicates at least the wavefront aberrations of an eye under measurement, with a correction factor for correcting refraction being taken into account, to generate target retina image data;

a correction-factor setting section for specifying a correction factor to be given to the image-data generation section; and

a determination section for determining whether the specified correction factor is appropriate, according to corrected target retina image data generated by the image-data generation section and corrected by the correction factor specified by the correction-factor setting section,

wherein the correction-factor setting section specifies the correction factor according to a result obtained by the determination section, and the correction-factor setting section changes the correction factor by the correction-factor setting section until the determination section determines that the correction factor is appropriate.

2. A correction-factor determination apparatus according to Claim 1, wherein the correction factor includes one of or a combination of plurality of a spherical power, an astigmatic power, and the angle of an astigmatic axis.

3. A correction-factor determination apparatus according to

Claim 2, wherein

the correction-factor setting section changes the correction factor in the order of the spherical power, the angle of the astigmatic axis, and the astigmatic power, and

the determination section determines whether the specified correction factor is appropriate in the order of the spherical power, the angle of the astigmatic axis, and the astigmatic power.

4. A correction-factor determination apparatus according to Claim 2, wherein, when the spherical power and/or the astigmatic power is selected as the correction factor, the image-data generation section sequentially changes the eyesight-test-chart target with which the simulation is performed to eyesight-test-chart targets having different sizes, and performs the simulation of how the eyesight-test-chart target is seen to generate the target retina image data.

5. A correction-factor determination apparatus according to Claim 2, wherein the eyesight-test-chart target with which the simulation is performed by the image-data generation section is a Landolt's ring target when it is determined whether the spherical power or the astigmatic power is appropriate.

6. A correction-factor determination apparatus according to Claim 1, wherein the determination section determines whether the specified correction factor is appropriate, by comparing a correlation degree of predetermined eyesight-test-chart-target matching pattern data with the target retina image data obtained by the simulation.

7. A correction-factor determination apparatus according to Claim 6, wherein the determination section performs determination with template matching by applying two-dimensional Fourier transform to the spatial frequency of a template and multiplying the resultant by the spatial frequency distribution of a retina image.

8. A correction-factor determination apparatus according to Claim 6, wherein the image-data generation section calculates a pupil function from the wavefront aberrations, calculates the luminance distribution function of an eyesight target, multiplies the luminance distribution function by the spatial frequency distribution of an eye, and applies two-dimensional inverse Fourier transform to the resultant to obtain target retina image data simulated measurement data which indicates the refractive power distribution of the eye under measurement and/or target retina image data corrected by the specified correction factor.

9. A correction-factor determination apparatus according to Claim 1, wherein

the image-data generation section generates MTF data as the simulation of how the eyesight-test-chart target is seen, with the measurement data which indicates at least the wavefront aberrations of the eye under measurement, and the correction factor for correcting refraction being taken into account, and

the determination section determines from the generated MTF data whether the correction factor is appropriate.

10. A correction-factor determination apparatus according to Claim 1, wherein the correction-factor setting section performs correction from a weak correction point.

11. A correction-factor determination apparatus according to Claim 1, wherein the correction-factor setting section performs correction according to a subjective measurement procedure.

12. A correction-factor determination apparatus according to Claim 1, further comprising

a display section for displaying the result of determination made by the determination section and the target retina image data generated by the image-data generation section, or for displaying target retina image data obtained with an appropriate correction factor and a correction factor close thereto.

13. A correction-factor determination method including:

a step of generating target retina image data by performing simulation of how an eyesight-test-chart target is seen, according to measurement data which indicates at least the wavefront aberrations of an eye under measurement, with a correction factor for correcting refraction being taken into account;

a step of specifying a correction factor for generating the target retina image data; and

a step of determining whether the specified correction factor is appropriate, according to corrected target retina

image data generated in the step of generating the target retina image data and corrected by the correction factor specified in the step of specifying the correction factor,

wherein the correction factor is specified in the step of specifying the correction factor, according to a result obtained in the step of determining, and the correction factor is changed in the step of specifying the correction factor until it is determined that the correction factor is appropriate in the step of determining.

14. A correction-factor determination method according to Claim 13, wherein the correction factor includes one of or a combination of plurality of a spherical power, an astigmatic power, and the angle of an astigmatic axis.

15. A correction-factor determination method according to Claim 14, wherein

the correction factor is changed in the order of the spherical power, the angle of the astigmatic axis, and the astigmatic power in the step of specifying the correction factor, and

it is determined whether the correction factor is appropriate in the order of the spherical power, the angle of the astigmatic axis, and the astigmatic power in the step of determining.

16. A correction-factor determination method according to Claim 14, wherein, when the spherical power and/or the astigmatic power is selected as the correction factor, the eyesight-test-chart target with which the simulation is

performed is sequentially changed to eyesight-test-chart targets having different sizes, and performs the simulation of how the eyesight-test-chart target is seen to generate the target retina image data, in the step of generating the target retina image data.

17. A correction-factor determination method according to Claim 14, wherein the eyesight-test-chart target with which the simulation is performed in the step of generating the target retina image data is a Landolt's ring target when it is determined whether the spherical power or the astigmatic power is appropriate.

18. A correction-factor determination method according to Claim 13, wherein it is determined whether the specified correction factor is appropriate, by comparing a correlation degree of predetermined eyesight-test-chart-target matching pattern data with the target retina image data simulated, in the step of determining.

19. A correction-factor determination method according to Claim 18, wherein determination is performed with template matching by applying two-dimensional Fourier transform to the spatial frequency of a template and multiplying the resultant by the spatial frequency distribution of a retina image, in the step of determining.

20. A correction-factor determination method according to Claim 18, wherein a pupil function is calculated from the wavefront aberrations, the luminance distribution function of

an eyesight target is calculated, the luminance distribution function is multiplied the resultant by the spatial frequency distribution of an eye, and two-dimensional inverse Fourier transform is applied to the resultant to obtain target retina image data obtained by simulating measurement data which indicates the refractive power distribution of the eye under measurement and/or target retina image data corrected by the specified correction factor, in the step of generating the target retina image data.

21. A correction-factor determination method according to Claim 13, wherein

MTF data is generated as the simulation of how the eyesight-test-chart target is seen, with the measurement data which indicates at least the wavefront aberrations of the eye under measurement, and the correction factor for correcting refraction being taken into account, in the step of generating the target retina image data, and

it is determined from the generated MTF data whether the correction factor is appropriate, in the step of determining.

22. A correction-factor determination method according to Claim 13, wherein correction is performed from a weak correction point in the step of specifying the correction factor.

23. A correction-factor determination method according to Claim 13, wherein correction is performed according to a subjective measurement procedure in the step of specifying the correction factor.

24. A correction-factor determination method according to Claim 13, further including a step of precisely measuring an astigmatic power and the angle of an astigmatic axis.

25. A correction-factor determination method according to Claim 13, further including a spherical-power fine-adjustment step of finely adjusting an obtained spherical power to obtain a spherical power which causes to obtain a further high visual acuity value.

26. A correction-factor determination method including:

a step of calculating which uses a first spherical power included in measurement data which indicates the refractive-power distribution of an eye under measurement, as a correction factor to calculate a second spherical power by the correction-factor determination method described in Claim 12;

a step of obtaining the second spherical power from the second spherical power by compensating a value based on a first astigmatic power included in the measurement data which indicates the refractive-power distribution of the eye under measurement; and

a step of calculating which uses the second spherical power as a correction factor to calculate a second astigmatic power by the correction-factor determination method described in Claim 13.

27. A correction-factor determination method according to one of Claims 13 to 26, wherein the wavefront aberrations comprise higher-order aberration.